

WHAT IS CLAIMED IS:

1. A method for preventing regulated supply undershoot in state retained latches of a leakage controlled system, the method comprising the steps of:

providing a leakage control voltage source configured to supply a sleep voltage level below an active operation core voltage level and above a predetermined minimum level during a sleep mode, such that the sleep voltage is high enough to allow logic device state retention in the leakage controlled system; and

biasing the voltage source via a reference voltage, wherein the reference voltage is provided via a charge storage device that is pre-charged to the active operation core voltage level when the system is in its active mode, such that when the system enters its sleep mode, the reference voltage slowly discharges to the sleep voltage level, and further such that when the system enters its sleep mode, the output of the voltage source goes through its transient phase and undershoots at a voltage level higher than the sleep voltage before finally settling to the sleep voltage level.

2. The method according to claim 1, wherein the step of providing a reference voltage via a pre-charged charge storage device comprises pre-charging a capacitor to the active operation core voltage level via a pre-charge switch.

3. The method according to claim 1, wherein the voltage source comprises a low drop-out regulator.

4. The method according to claim 1, wherein the voltage source comprises a linear regulator.

5. The method according to claim 1, wherein the voltage source comprises a switched regulator.

6. A method for preventing regulated supply undershoot in state retained latches of a leakage controlled system, the method comprising the steps of:

providing means for supplying a sleep voltage level below an active operation core voltage level and above a predetermined minimum level during a sleep mode, such that the sleep voltage is high enough to allow logic device state retention in the leakage controlled system; and

biasing the sleep voltage level supplying means via a reference voltage provided by a charge storage device that is pre-charged to the active operation core voltage level when the system is in its active mode, such that when the system enters its sleep mode, the reference voltage slowly discharges to the sleep voltage level, and further such that when the system enters its sleep mode, the output of the sleep voltage level supplying means goes through its transient phase and undershoots at a voltage level higher than the sleep voltage before finally settling to the sleep voltage level.

7. The method according to claim 6, wherein the step of biasing the sleep voltage level supplying means via a reference voltage provided by a pre-charged charge storage device comprises pre-charging a capacitor to the active operation core voltage level via a pre-charge switch.

8. The method according to claim 6, wherein the means for supplying a sleep voltage level below an active operation core voltage level and above a predetermined minimum level during a sleep mode, such that the sleep voltage is high enough to allow logic device state retention in the leakage controlled system, comprises a leakage control low drop-out regulator.

9. The method according to claim 6, wherein the means for supplying a sleep voltage level below an active operation core voltage level and above a predetermined minimum level during a sleep mode, such that the sleep voltage is high enough to allow logic device state retention in the leakage controlled system, comprises a leakage control voltage source.

10. The method according to claim 9, wherein the voltage source comprises a low drop-out regulator.
11. The method according to claim 9, wherein the voltage source comprises a linear regulator.
12. The method according to claim 9, wherein the voltage source comprises a switched regulator.
13. A leakage control voltage source configured to prevent regulated supply undershoot in a leakage controlled system and to supply a sleep voltage level below an active operation core voltage level and above a predetermined minimum level during a sleep mode, such that the sleep voltage is high enough to allow logic device state retention in the leakage controlled system.
14. The leakage control voltage source according to claim 13, further comprising a charge storage device that is pre-charged to the active operation core voltage level when the leakage controlled system is in its active mode, such that when the system enters its sleep mode, the charge storage device slowly discharges to the sleep voltage level, and further such that when the system enters its sleep mode, the output of the voltage source goes through its transient phase and undershoots at a voltage level higher than the sleep voltage before finally settling to the sleep voltage level.
15. The leakage control voltage source according to claim 14, further comprising a pre-charge switch configured to transfer a pre-charge to the charge storage device..
16. The leakage control voltage source according to claim 14, wherein the charge storage device comprises at least one capacitor.
17. The leakage control voltage source according to claim 16, further comprising a pre-charge switch configured to transfer a pre-charge to the at least one capacitor.

18. The leakage control voltage source according to claim 13, wherein the voltage source comprises a low drop-out regulator.
19. The leakage control voltage source according to claim 13, wherein the voltage source comprises a linear regulator.
20. The leakage control voltage source according to claim 13, wherein the voltage source comprises a switched regulator.
21. A leakage control voltage source operational in response to a reference voltage to prevent undesirable regulated supply undershoot in a leakage controlled system and to supply a sleep voltage level below an active operation core voltage level and above a predetermined minimum level during a sleep mode, such that the sleep voltage is high enough to allow logic device state retention in the leakage controlled system.
22. The leakage control voltage source according to claim 21, wherein the reference voltage includes a decay that prevents the undesirable regulated supply undershoot.
23. The leakage control voltage source according to claim 21, further comprising a charge storage device that is pre-charged to the active operation core voltage level when the leakage controlled system is in its active mode, such that when the system enters its sleep mode, the charge storage device slowly discharges to the sleep voltage level, and further such that when the system enters its sleep mode, the output of the voltage source goes through its transient phase and undershoots at a voltage level higher than the sleep voltage before finally settling to the sleep voltage level.
24. The leakage control voltage source according to claim 23, further comprising a pre-charge switch configured to transfer a pre-charge to the charge storage device.
25. The leakage control voltage source according to claim 23, wherein the charge storage device comprises at least one capacitor.

26. The leakage control voltage source according to claim 25, further comprising a pre-charge switch configured to transfer a pre-charge to the at least one capacitor.
27. The leakage control voltage source according to claim 21, wherein the reference voltage is generated via a low drop-out regulator.
28. The leakage control voltage source according to claim 21, wherein the reference voltage is generated via a linear regulator.
29. The leakage control voltage source according to claim 21, wherein the reference voltage is generated via a switched regulator.